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EXAMINER

LIU, LI

ART UNIT	PAPER NUMBER
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2613

DATE MAILED: 11/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/792,004

Applicant(s)

TIAN ET AL.

Examiner

Li Liu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 3/30/04, 4/20/04, 6/23/05, 5/5/06.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statements (IDS) submitted on 03/30/2004, 04/20/2004, 06/23/2005 and 05/05/2006 are being considered by the examiner.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-5 and 14-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Bacque (US 2004/0008931).

1). With regard to claim 1, Bacque discloses an optical network (Figure 12), comprising:

a first optical ring (e.g., Ring B in Figure 12) and a second optical ring (e.g., Ring C in Figure 12), each optical ring operable to communicate optical traffic comprising a plurality of sub-bands ([0083]);

the first optical ring comprising a first interconnect node (102f in Figure 12), the first interconnect node operable to filter traffic (fiber Bragg gratings as the filters, [0076])

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in a first sub-band from the first optical ring for communication to the second optical ring ([0083]); and

the second optical ring (Ring C in Figure 12) comprising a second interconnect node (102g in Figure 12), the second interconnect node operable to receive the filtered traffic in the first sub-band from the first interconnect node for communication in the second optical ring ([0084]).

2). With regard to claim 2, Bacque discloses wherein the first interconnect node is operable to communicate the filtered traffic in the first sub-band to the second interconnect node without electrical conversion of the filtered traffic ([0086], optical signals which don't require wavelength conversion can be routed through the photonic cross-connect and directly to another ring).

3). With regard to claim 3, Bacque discloses wherein the first interconnect node is operable to communicate the filtered traffic in the first sub-band to the second interconnect node without amplification of the filtered traffic (Figure 12, [0086], no amplifiers present for the interconnecting).

4). With regard to claim 4, Bacque discloses wherein the first interconnect node comprises a plurality of cascaded sub-band filters (the interconnect node 102 has a plurality of fiber Bragg gratings, [0076]) operable to isolate traffic in the first sub-band from continued communication on the first optical ring through the first interconnect node.

5). With regard to claim 5, Bacque discloses all of the subject matter as applied to claim 1 above. And Bacque discloses a demux-mux module. But Bacque does not

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expressly disclose that the demux-mux module is operable to selectively pass or terminate individual channels of the filtered traffic in the first sub-band before communication in the second optical ring.

However, in the demux-mux module of Bacque's system, a wavelength conversion resource is used to determine the desired output wavelengths in order to overcome color blocking between optical network rings ([0092]). And the optical signals that don't require wavelength conversion can be routed through the photonic cross-connect and directly to another ring. And Bacque also discloses that the optical combiner or multiplexer comprises a band filter (page 7 left column, claim 8). Therefore, Bacque's system is fully capable for selectively passing or terminating individual channels of the filtered traffic in the first sub-band before communication in the second optical ring; that is, the teaching of the reference is functionally equivalent to the claimed limitation.

6). With regard to claim 14, Bacque discloses a method for communicating traffic between optical rings, comprising:

communicating optical traffic through a first optical ring (e.g., Ring B in Figure 12), the optical traffic comprising a plurality of sub-bands ([0083]);

filtering (102 in Figure 12, consist of a plurality of fiber Bragg gratings), for communication to a second optical ring, traffic in a first sub-band from the first optical ring at a first interconnect node (102f in Figure 12) of the first optical ring;

receiving the filtered traffic in the first sub-band from the first interconnect node at a second interconnect node (102g in Figure 12) of the second optical ring for communication in the second optical ring.

7). With regard to claim 15, Bacque discloses wherein the filtered traffic in the first sub-band is communicated to the second interconnect node without electrical conversion of the filtered traffic ([0086], optical signals which don't require wavelength conversion can be routed through the photonic cross-connect and directly to another ring).

8). With regard to claim 16, Bacque discloses wherein the filtered traffic in the first sub-band is communicated to the second interconnect node without amplification of the filtered traffic (Figure 12, [0086], no amplifiers present for the interconnecting).

9). With regard to claim 17, Bacque discloses the method, further comprising isolating traffic in the first sub-band from continued communication on the first optical ring through the first interconnect node at a plurality of cascaded sub-band filters of the first interconnect node (the interconnect node 102 has a plurality of fiber Bragg gratings, [0076]).

10). With regard to claim 18, Bacque discloses all of the subject matter as applied to claim 14 above. And Bacque discloses a demux-mux module. But Bacque does not expressly disclose the method further comprises selectively passing or terminating at a demux-mux unit individual channels of the filtered traffic in the first sub-band before communication in the second optical ring.

However, in the demux-mux module of Bacque's system, a wavelength conversion resource is used to determine the desired output wavelengths in order to overcome color blocking between optical network rings ([0092]). And the optical signals that don't require wavelength conversion can be routed through the photonic cross-connect and directly to another ring. And Bacque also discloses that the optical combiner or multiplexer comprises a band filter (page 7 left column, claim 8). Therefore, Bacque's system is fully capable for selectively passing or terminating individual channels of the filtered traffic in the first sub-band before communication in the second optical ring; that is, the teaching of the reference is functionally equivalent to the claimed limitation.

4. Claims 8-11 and 21-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Stern (US 6,895,186).

1). With regard to claim 8, Stern discloses an optical network (Figure 4), comprising:

a first optical ring (103 in Figure 1) and a second optical ring (104 in Figure 1), each optical ring operable to communicate optical traffic comprising a plurality of sub-bands (Figure 4, optical signals are communicated within each ring or between the WADM 207 of the first ring and WADM 208 of the second ring);

the first optical ring comprising a first interconnect node (WADM 207 in Figure 4) operable to selectively switch (switches 407 in Figure 4) to the second optical ring traffic in a first sub-band from the first optical ring (column 12 line 43-66); and

the second optical ring comprising a second interconnect node (WADM 208 in Figure 4), the second interconnect node operable to receive the switched traffic in the first sub-band from the first optical ring for communication in the second optical ring (column 13 line 39-66).

2). With regard to claim 9, Stern discloses wherein the first interconnect node is operable to communicate the switched traffic in the first sub-band to the second interconnect node without electrical conversion of the filtered traffic (Figure 4, the output 410 from switch 407 is directly connected to the input 419 of switch 418, no electrical conversion).

3). With regard to claim 10, Stern discloses wherein wherein the first interconnect node is operable to communicate the switched traffic in the first sub-band to the second interconnect node without amplification of the filtered traffic (Figure 4, the output 410 from switch 407 is directly connected to the input 419 of switch 418, no amplifier is presented).

4). With regard to claim 11, Stern discloses wherein the first interconnect node comprises:

a demultiplexer (401 in Figure 4) operable to demultiplex optical traffic received into its constituent sub-bands;

a plurality of switch elements (407 in Figure 4) each operable to pass through for communication through the first interconnect node (406 in Figure 4, and then to 210) or switch to the second optical ring traffic in a respective sub-band (307 in Figure 4); and

a multiplexer (405 in Figure 4) operable to multiplex traffic in each sub-band passed through for communication through the first interconnect node (to 210 in Figure 4).

5). With regard to claim 21, Stern discloses a method for communicating traffic between optical rings, comprising:

communicating optical traffic through a first optical ring (103 in Figure 1), the optical traffic comprising a plurality of sub-bands (the ring carrying up to "W" WDM signals, column 2 line 62 to column 3 line 16);

selectively switching (switches 407 in Figure 4), for communication to a second optical ring, traffic in a first sub-band from the first optical ring at a first interconnect node of the first optical ring (column 12 line 43-66);

receiving the switched traffic in the first sub-band from the first interconnect node at a second interconnect node (WADM 208 in Figure 4) of the second optical ring for communication in the second optical ring (column 13 line 39-66).

6). With regard to claim 22, Stern discloses wherein the switched traffic in the first sub-band is communicated to the second interconnect node without electrical conversion of the filtered traffic (Figure 4, the output 410 from switch 407 is directly connected to the input 419 of switch 418, no electrical conversion).

7). With regard to claim 23, Stern discloses wherein the switched traffic in the first sub-band is communicated to the second interconnect node without amplification of the filtered traffic (Figure 4, the output 410 from switch 407 is directly connected to the input 419 of switch 418, no amplifier is presented).

8). With regard to claim 24, Stern discloses the method, further comprising:
demultiplexing (401 in Figure 4) at the first interconnect node traffic received into its constituent sub-bands;

passing through for communication through the first interconnect node (through 210 in Figure 4) or switching to the second optical ring traffic (switch to WADM 208 in Figure 4) in the plurality of sub-bands at a plurality of switch elements (407 in Figure 4), each of the plurality of switch elements passing through or switching a respective sub-band (column 12 line 43-66); and

multiplexing traffic (405 in Figure 4) in each sub-band passed through for communication through the first interconnect node (to 210 in Figure 4).

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claim 27 is rejected under 35 U.S.C. 102(a) as being anticipated by Li et al (US 6,616,349).

Li et al discloses an optical network (Figures 2, 4-7), comprising:
a first optical ring (20 in Figure 2), a second optical ring (30 in Figure 2) and a third optical ring (40 in Figure 2), each optical ring operable to communicate optical traffic comprising a plurality of sub-bands (column 5 line 10-27 and column 6 line 1-22);
the first optical ring (20 in Figure 2) comprising: a first sub-band interconnect node (50 in Figures 2 and 4, with the wavelength-selective switch card at 70 in Figure 8)

operable to filter traffic in a first sub-band from the first optical ring for communication to the second optical ring (wavelength-selective switches, column 6, line 1-22);

a second sub-band interconnect node (60 in Figures 2, 6 and 7, with the wavelength-selective switch card at 70 in Figure 8) operable to filter traffic in the first sub-band from the first optical ring for communication to the third optical ring wavelength-selective switches, column 6, line 1-22);

the second optical ring comprising a third sub-band interconnect node (the third interconnect node with the first interconnect node forms the node 50 in Figure 2, and Figure 8), the third sub-band interconnect node operable to receive the filtered traffic in the first sub-band (Figure 8) from the first sub-band interconnect node for communication in the second optical ring (column 5 line 10-27 and column 6, line 1-22); and

the third optical ring comprising a fourth sub-band interconnect node (the fourth interconnect node with the second interconnect node forms the node 60 in Figures 2, 6 and 8, and Figure 8), the fourth sub-band interconnect node operable to receive the filtered traffic in the first sub-band (Figure 8) from the second sub-band interconnect node for communication in the third optical ring (column 5 line 10-27 and column 6, line 1-22);

wherein the first sub-band interconnect node is operable to communicate the filtered traffic in the first sub-band to the third interconnect node without electrical conversion or amplification of the filtered traffic (Figure 4 and Figure 8, wavelength-

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selective switches are used to communicate the traffic, no electrical conversion or amplification is present in the interconnect node 50); and

wherein the second sub-band interconnect node is operable to communicate the filtered traffic in the first sub-band to the fourth sub-band interconnect node without electrical conversion or amplification of the filtered traffic (Figure 4 and Figure 8, wavelength-selective switches are used to communicate the traffic, no electrical conversion or amplification is present in the interconnect node 60).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bacque (US 2004/0008931) as applied to claim 1 above, and in view of Terahara (US 6,061,157).

1). With regard to claim 6, Bacque discloses all of the subject matter as applied to claim 1 above.

But Bacque does not expressly disclose wherein: the second interconnect node is operable to filter traffic in the first sub-band from the second optical ring for communication to the first optical ring; the first interconnect node is operable to receive the filtered traffic in the first sub-band from the second interconnect node for

communication in the first optical ring; and wherein the second interconnect node is operable to communicate the filtered traffic in the first sub-band to the first interconnect node without electrical conversion or amplification of the filtered traffic.

In Figure 12, Bacque discloses that Ring B is operable to direct a first sub-band to the Ring C (that is B -> C), and Ring A is operable to direct a first sub-band to the Ring D. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the second interconnect node to also direct first sub-band from the second optical ring (Ring C in Figure 12) for communication to the first optical ring (Ring B in Figure 12, that is C -> B). Terahara discloses such kind of interconnection (Figure 6). Through the bi-directional interconnection, the optical signals can be transmitted between the two rings and more flexible signal flows can be implemented. Claim 6 is not patentable different from the structure of Bacque, because it is "to duplicate a part for a multiple effect" (see *St. Regis Paper Company v. Bemis Company, Inc.*, 193 USPQ 8 (CA 7 1977)).

9. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bacque (US 2004/0008931) as applied to claim 14 above, and in view of Li et al (US 6,616,349).

Bacque discloses all of the subject matter as applied to claim 14 above. But Bacque does not expressly disclose the method, further comprising: filtering, for communication to the first optical ring, traffic in the first sub-band from the second optical ring at a second interconnect node of the second optical ring; receiving the filtered traffic in the first sub-band from the second interconnect node at the first interconnect node of the first optical ring for communication in the first optical ring; and

wherein the filtered traffic in the first sub-band is communicated to the first interconnect node without electrical conversion or amplification of the filtered traffic.

In Figure 12, Bacque discloses that Ring B is operable to filter a first sub-band and direct the filtered sub-band to the Ring C (that is B -> C). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the second interconnect node to also direct first sub-band from the second optical ring (Ring C in Figure 12) for communication to the first optical ring (Ring B in Figure 12, that is B -> C). Li et al discloses such kind of interconnection (Figure 8, wavelength-selective switch are used to interconnect the two rings). Through the interconnection, the optical signals can be transmitted between the two rings and more flexible signal flows can be implemented. Claim 19 is not patentable different from the structure of Bacque, because it is "to duplicate a part for a multiple effect" (see *St. Regis Paper Company v. Bemis Company, Inc.*, 193 USPQ 8 (CA 7 1977)).

10. Claims 7 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bacque (US 2004/0008931) as applied to claims 1 and 14 above, and in view of Terahara (US 6,061,157) and Stern (US 6,895,186).

1). With regard to claim 7, Bacque discloses all of the subject matter as applied to claim 1 above.

But Bacque does not expressly discloses wherein: (A) the second interconnect node comprises a hub node operable to selectively switch to the first optical ring traffic in the first sub-band from the second optical ring; (B) the first interconnect node operable to receive the switched traffic in the first sub-band from the second optical ring

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for communication in the first optical ring; and (C) wherein the second interconnect node is operable to communicate the switched traffic in the first sub-band to the first interconnect node without electrical conversion or amplification of the filtered traffic.

With regard to item (B) and (C), in Figure 12, Bacque discloses that Ring B is operable to direct a first sub-band to the Ring C (that is B -> C), and Ring A is operable to direct a first sub-band to the Ring D without electrical conversion or amplification of the filtered traffic. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the second interconnect node to also direct first sub-band from the second optical ring for communication to the first optical ring (that is C -> B), and then the first interconnect node operable to receive the switched traffic in the first sub-band from the second optical ring for communication in the first optical ring and wherein the second interconnect node is operable to communicate the switched traffic in the first sub-band to the first interconnect node without electrical conversion or amplification of the filtered traffic. Terahara discloses such kind of interconnection (Figure 6). Through the bi-directional interconnection, the optical signals can be transmitted between the two rings and more flexible signal flows can be implemented. Claim 7 is not patentable different from the structure of Bacque, because it is "to duplicate a part for a multiple effect" (see *St. Regis Paper Company v. Bemis Company, Inc.*, 193 USPQ 8 (CA 7 1977)).

With regard to item (A), Bacque in view of Terahara does not disclose the second interconnect node comprises a **hub node** operable to selectively **switch** to the first optical ring traffic in the first sub-band from the second optical ring. However, Stern,

in the same field of endeavor, discloses a hub node (207 in Figure 4) operable to selectively switch (switches 407 in Figure 4) to the first optical ring traffic in the first sub-band (column 12 line 43-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the hub node with switches as taught by Stern to the system of Bacque in view of Terahara so that the connecting between rings and the wavelength management can be made easier.

2). With regard to claim 20, Bacque discloses all of the subject matter as applied to claim 14 above.

But Bacque does not expressly disclose the method, further comprising: (A) selectively switching to the first optical ring traffic in the first sub-band from the second optical ring at the second interconnect node, wherein the second interconnect node comprises a hub node; (B) receiving the switched traffic in the first sub-band from the second optical ring at the first interconnect node for communication in the first optical ring; and (C) wherein the switched traffic in the first sub-band is communicated to the first interconnect node without electrical conversion or amplification of the filtered traffic.

With regard to item (B) and (C), in Figure 12, Bacque discloses that Ring B is operable to direct a first sub-band to the Ring C (that is B -> C), and Ring A is operable to direct a first sub-band to the Ring D without electrical conversion or amplification of the filtered traffic. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the second interconnect node to also direct first sub-band from the second optical ring for communication to the first optical

ring (that is C -> B), and then the first interconnect node operable to receive the switched traffic in the first sub-band from the second optical ring for communication in the first optical ring and wherein the second interconnect node is operable to communicate the switched traffic in the first sub-band to the first interconnect node without electrical conversion or amplification of the filtered traffic. Terahara discloses such kind of interconnection (Figure 6). Through the bi-directional interconnection, the optical signals can be transmitted between the two rings and more flexible signal flows can be implemented. Claim 7 is not patentable different from the structure of Bacque, because it is "to duplicate a part for a multiple effect" (see *St. Regis Paper Company v. Bemis Company, Inc.*, 193 USPQ 8 (CA 7 1977)).

With regard to item (A), Bacque in view of Terahara does not disclose the method further comprises a **hub node** and selectively **switching** to the first optical ring traffic in the first sub-band from the second optical ring at the second interconnect node. However, Stern, in the same field of endeavor, discloses a hub node (207 in Figure 4) operable to selectively switch (switches 407 in Figure 4) to the first optical ring traffic in the first sub-band (column 12 line 43-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the hub node with switches as taught by Stern to the system of Bacque in view of Terahara so that the connecting between rings and the wavelength management can be made easier.

11. Claims 12 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stern (US 6,895,186) as applied to claims 8 and 21 above, and in view of Bacque (US 2004/0008931).

1). With regard to claim 12, Stern discloses all of the subject matter as applied to claim 8 above. But Stern does not disclose the optical network of, further comprising a demux-mux module operable to selectively pass or terminate individual channels of the switched traffic in the first sub-band before communication in the second optical ring.

However, Bacque discloses demux-mux module (26 and 74 in Figure 12) which is intended for wavelength conversion and to determine the desired output wavelengths so to overcome color blocking between optical network rings ([0092]), and the optical signals that don't require wavelength conversion can be routed through the photonic cross-connect and directly to another ring. And Bacque also discloses that the optical combiner or multiplexer comprises a band filter (page 7 left column, claim 8). Since no wavelength conversion is required in Stern's system, Bacque's system is fully capable for selectively passing or terminating individual channels of the filtered traffic in the first sub-band before communication in the second optical ring.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the demux-mux unit with selectively passing function as taught by Stern to the system of Stern so that the connecting between rings and the wavelength management can be made easier.

2). With regard to claim 25, Stern discloses all of the subject matter as applied to claim 21 above. But Stern does not disclose that the method further comprises

selectively passing or terminating at a demux-mux unit individual channels of the switched traffic in the first sub-band before communication in the second optical ring.

However, Bacque discloses demux-mux module (26 and 74 in Figure 12) which is intended for wavelength conversion and to determine the desired output wavelengths so to overcome color blocking between optical network rings ([0092]), and the optical signals that don't require wavelength conversion can be routed through the photonic cross-connect and directly to another ring. And Bacque also discloses that the optical combiner or multiplexer comprises a band filter (page 7 left column, claim 8). Since no wavelength conversion is required in Stern's system, Bacque's system is fully capable for selectively passing or terminating individual channels of the filtered traffic in the first sub-band before communication in the second optical ring.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the demux-mux unit with selectively passing function as taught by Stern to the system of Stern so that the connecting between rings and the wavelength management can be made easier.

12. Claims 13 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stern (US 6,895,186) as applied to claims 8 and 21 above, and in view of Terahara (US 6,061,157).

1). With regard to claim 13, Stern discloses all of the subject matter as applied to claim 8 above. But Stern does not expressly disclose wherein: the second interconnect node is operable to selectively switch to the first optical ring traffic in the first sub-band from the second optical ring; the first interconnect node operable to receive the switched

traffic in the first sub-band from the second optical ring for communication in the first optical ring; and wherein the second interconnect node is operable to communicate the switched traffic in the first sub-band to the first interconnect node without electrical conversion or amplification of the filtered traffic.

In Figure 4, Stern discloses that the WADM 207 of the first ring is operable to direct a first sub-band to the WADM 208 of the second ring (that is, 207 -> 208 in Figure 4) without electrical conversion or amplification of the filtered traffic, and WADM 208 of the second ring is operable to direct a sub-band to multiplex 414 too. Therefore, similar the connection from the output of switch 407 to the input of switch 418, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the second interconnect node to also direct first sub-band from the second optical ring for communication to the first optical ring; that is to make the output switch 418 to be connected to the input of switch 407 (that is, 208 -> 207 in Figure 4).

Terahara discloses such kind of interconnection (Figures 6). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the interconnection as taught by Terahara to the system of Stern so that the optical signals can be transmitted between the two rings, and more flexible signal flows can be implemented.

2). With regard to claim 26, Stern discloses all of the subject matter as applied to claim 21 above. But Stern does not expressly the method further comprising: selectively switching, for communication to the first optical ring, traffic in the first sub-band from the second optical ring at a second interconnect node of the second optical ring; receiving

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the switched traffic in the first sub-band from the second interconnect node at the first interconnect node of the first optical ring for communication in the first optical ring; and wherein the switched traffic in the first sub-band is communicated to the first interconnect node without electrical conversion or amplification of the filtered traffic.

In Figure 4, Stern discloses that the WADM 207 of the first ring is operable to direct a first sub-band to the WADM 208 of the second ring (that is, 207 -> 208 in Figure 4) without electrical conversion or amplification of the filtered traffic, and WADM 208 of the second ring is operable to direct a sub-band to multiplex 414 too. Therefore, similar the connection from the output of switch 407 to the input of switch 418, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the second interconnect node to also direct first sub-band from the second optical ring for communication to the first optical ring; that is to make the output switch 418 to be connected to the input of switch 407 (that is, 208 -> 207 in Figure 4).

Terahara discloses such kind of interconnection (Figures 6). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the interconnection as taught by Terahara to the system of Stern so that the optical signals can be transmitted between the two rings, and more flexible signal flows can be implemented.

13. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al (US 6,616,349) as applied to claim 27 above, and in view of Bacque (US 2004/0008931).

Li et al disclose all of the subject matter as applied to claim 27 above. Li et al discloses wavelength-selective switches in the first and second sub-band interconnect nodes. But Li et al does not disclose wherein the first and second sub-band interconnect nodes each comprise a plurality of **cascaded** sub-band filters operable to isolate received traffic in the first sub-band from continued communication on the first optical ring through the first and second sub-band interconnect nodes, respectively.

However, Bacque discloses a interconnect nodes (102f, 102g etxc, in Figure 12) each comprise a plurality of cascaded sub-band filters (102f has a plurality of fiber Bragg gratings as the filters, [0076]), operable to isolate received traffic in the first sub-band from continued communication on the first optical ring through the first and second sub-band interconnect nodes ([0082]-[0086]).

Cascaded fiber Bragg gratings has been widely used as the optical add/drop elements in the art because of their low loss, ease of coupling and simple packaging etc. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the filters of cascaded fiber Bragg gratings as taught by Bacque to the system of Li et al so that the system loss can be reduced and the coupling efficiency can be increased.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Way (US 7,120,359) discloses a interconnection of multiple rings.

Liu et al (US 6,208,443) discloses a dynamics optical add-drop multiplexing and wavelength routing networks.

Li et al (US 2003/0025956) discloses a interconnections of rings.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Li Liu whose telephone number is (571)270-1084. The examiner can normally be reached on Mon-Fri, 8:00 am - 5:30 pm, alternating Fri off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER

Li Liu
November 21, 2006